

L 7059-66

ACC NR: AP5021474

where ρ and β are density and compressibility, index o indicates the cavitationless fluid, index k is the cavitation field of the fluid, and β_k is the compressibility of the steam - gas mixture. In the case of water, $\beta_k/\beta_o \approx 10^4$, K is of the order of $K \approx 10^{-3}$, and $\rho_k c_k = 0.3 \rho_o c_o$. [ATD Press: 4134-E]

SUB CODE: 202 / SUBM DATE: 04Jan65 / ORIG REF: 007 / OTH REF: 004

BC
Card 5/5

L 36537-66 EWT(m)/EWP(t)/ETI IJP(6) ID/JW/JG/WB

ACC NR: AP6016824

(N)

SOURCE CODE: UR/0046/66/002/0150/0166

AUTHOR: Akulichev, V. A.

ORG: Acoustics Institute, AN SSSR, Moscow (Akusticheskiy institut AN SSSR)

TITLE: Hydration of ions and cavitation strength of water

SOURCE: Akusticheskiy zhurnal, v. 12, no. 2, 1966, 160-166

TOPIC TAGS: cavitation, hydration, water, ultrasonic effect, ion concentration

ABSTRACT: The author discusses experimental data on the basis of which it is possible to determine the forces which act on a gas bubble in water. An experimental measurement was made of the threshold pressure of ultrasonic cavitation as the concentration of different ions in water is varied. The cavitation far from the radiating surfaces in the water was produced by the procedure proposed by W. Y. Galloway (J. Acoust. Soc. America 1954, v. 26, no. 5, 849-857). The cavitation was produced at a frequency of 22.5 kcs with barium titanate transducer. The experimental setup and procedure are described in detail. The experiments consisted essentially of determining the threshold pressure of the cavitation as the concentration of the ions of different salts was gradually increased. The experiments show that introduction of K^+ , Br^- , Cs^+ , F^- , Cl^- , and I^- ions, which produce negative hydration, in distilled water decreases its cavitation strength, and that the effect depends appreciably on the gas content of the water. If ions producing positive hydration are introduced (Mg^{++} , Li^+ , Na^+) there is no effect on the cavitation strength of water.

Card 1/2

UDC: 534.29: 532.52

L 36537-66

ACC NR: AP6016824

It is concluded that the gas bubble in the water is acted upon not only by the hydrostatic pressure and the surface tension, but also tension due to the Coulomb forces of like-charged ions. These conclusions can be reconciled with data by other workers. The author thanks L. D. Rozenberg and V. I. Il'ichev for interest in the work and also V. P. Yelistratov and P. L. Arkhangel'skiy for help with the measurements. Orig. art. has: 3 figures and 5 formulas.

SUB CODE: 20/ SUBM DATE: 26Dec64/ ORIG REF: 004/ OTH REF: 006

Cord

2/2/11/18

AKULIN, D.; SELIVANOV, Yu.

Against the commonplace in the organization of competition.
Sov. profsoiuzy 3 no.5:40-46 My '55. (MIRA 8:8)
(Socialist competition)

AKULIN, D., starshiy predpdavatel'.

Economic results of industrial accidents. Okhr. truda i sets.
strakh. no.2:11-14 Ag '58. (MIRA 12:1)

1. Moskovskiy stankeinstrumental'nyy institut imeni I.V. Stalina.
(Accidents)

MIKHAYLOV, Fedor Mikhaylovich [deceased]; ZOLOTNITSKIY, N.D., prof.,
doktor tekhn.nauk, retsenzent; MARFENIN, V.S., inzh., retsenzent;
AKULIN, D.F., kand.ekonom.nauk, red.; SEMENOVA, M.M., red.izd-va;
CHERKOVA, Z.I., tekhn.red.

[Fundamentals of labor protection in the machinery industry]
Osnovy okhrany truda v mashinostroenii. Moskva, Gos.nauchno-tekhn.
izd-vo mashinostroit.lit-ry, 1960. 208 p.

(MIRA 13:12)

1. Rukovoditel' kafedry tekhniki bezopasnosti Moskovskogo inzhenerno-stroitel'nogo instituta (for Zolotnitskiy).
(Machinery industry--Hygienic aspects)
(Labor laws and legislation)

AKULIN, D.F., kand. ekon. nauk, dotsent

Eliminating industrial accidents. Vest. mashinostr. 45 no.4:
75-77 Ap '65. (MIRA 18:5)

AKULIN, L.V.

Stamping the straining holes of a teapot. Stek. i ker. 18
no. 3:35-36 Mr '61. (MIRA 14:5)
(Porcelain)

AKULIN, M.A.
AKULIN, M.A.

[Prevention of suppurative diseases of the skin] Preduprezhdenie
gnoinichkovykh zabolevanii kozhi. Moskva, Voennoe izd-vo minister-
stva oborony Soyuza SSR, 1957. 35 p. (MIRA 11:2)
(SKIN--DISEASES)

AKULIN, N.V.

Design characteristics of the gearbox of the GAZ-66 automobile.

Avt.prom. no.3:3-4 Mr '61.

(MIRA 14:3)

1. Gor'kovskiy avtozavod.

(Automobiles—Transmission devices)

AKULIN, P., Moskva.

Exhibition of appliances. Prom. keep. 12 no.9:22 8 '58.

(MIRA 11:10)

(Vocational rehabilitation) (Moscow--Handicapped, Apparatus for)

POTOSKUYEV, M.N., kand.tekhn.nauk; AKULIN, V.I., inzh.

Equipment for the determination of the coefficient of sliding
friction. Izv.vys. ucheb. zav.; chern.met no.9:155-157 S '58.
(MIRA 11:11)

1. Ivanovskiy energeticheskiy institut.
(Rolling (Metalwork))

L 28482-66 EPF(n)-2/ENT(1)/ETC(f)/ENG(m) IJP(c) AT

ACC NR: AP6013120 SOURCE CODE: UR/0057/66/036/004/0646/0652

AUTHOR: Akulina, D.K. 65
62
B

ORG: none

TITLE: Determination of plasma densities in a metallic apparatus by exciting high mode oscillations

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 4, 1966, 646-652

TOPIC TAGS: plasma diagnostics, plasma density, plasma decay, microwave, resonant cavity, toroidal geometry

ABSTRACT: Densities of decaying plasmas in a large metallic toroidal chamber (large and small radii, 60 cm and 5 cm) have been measured by observing the shift of the high mode resonant frequencies of the chamber, regarded as a cavity resonator. Plasma was produced in the chamber by several Bostick-type guns, and there was a longitudinal magnetic field of from 2 to 6 kOe. The toroidal chamber was excited in the 8 mm wavelength region by a klystron oscillator whose frequency could be varied over a range of some 40 MHz. The 8 mm wavelength region was selected for the measurements because the frequency is well above the Larmor frequency, a good Q factor could be achieved, and the form factor of the resonator could be assumed to have the geometric value. The klystron was coupled to the toroidal chamber with the aid of a nonconfocal open reson-

Cord 1/2 UDC: 533.9.07

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ACC NR: AP6013120

ator of the Fabry-Perot type consisting of two 3 cm diameter concave reflectors with 15 cm curvature radius facing each other at a distance of 21 cm across a small diameter of the torus through two 3.4 cm diameter windows in the wall of the chamber. Power from the klystron, modulated at 460 kHz, was fed to one of the reflectors of the open resonator, and the signal at the other reflector was rectified, amplified at 460 kHz with a 30 kHz passband amplifier, and displayed on an oscilloscope. The resonance curve of the empty toroidal chamber was recorded over a frequency interval of 40 MHz; there were 7 peaks in this frequency range. During a plasma decay measurement the klystron frequency was held constant at a value corresponding to a recognizable feature of the empty chamber resonance curve, and the oscilloscope trace showed a number of maxima and minima due to shift of the resonance curve owing to the presence of the plasma. Features of the oscilloscope trace were identified with features of the empty chamber resonance curve, and thus the frequency shift, and therefore the plasma density, was determined at different times during the decay. Plasma densities from about 6×10^{10} to 10^9 cm^{-3} were recorded both with the microwave resonance technique and with a probe. The two methods gave concordant results for high density plasmas and in weak magnetic fields. When the plasma density was low and the magnetic field was strong, the densities measured with the probe were considerably lower than those measured with the microwave resonance technique; this discrepancy is ascribed to inaccuracy of the probe measurements under these conditions. The resonant modes and the form factor of a toroidal resonator are discussed briefly in two appendices. The author thanks I.S. Shpigel for his interest and valuable discussions, and Yu.I. Nechayev and P.F. Kozlov for assisting with adjustment of parts of the apparatus. Orig. art. has: 10 formulas and 5 figures.

SUB CODE: 20

SUBM DATE: 10Mar66

ORIG. REF: 003

OTH REF: 004

Card 2/2 (16)

ACCESSION NR: AT4025296

S/0000/63/000/000/0078/0085

AUTHORS: Akulina, D. K.; Nechayev, Yu. I.

TITLE: Interferometer system using an electronic phase shifter for the measurement of rapid phase variation in the microwave band

SOURCE: Diagnostika plazmy* (Plasma diagnostics); sb. statey. Moscow, Gosatomizdat, 1963, 78-85

TOPIC TAGS: microwave plasma, phase shifter, electromagnetic interference, plasma density, electron density

ABSTRACT: In view of some shortcomings of the Wharton scheme for interferometric determination of the change in phase of a microwave signal passing through a plasma (University of California Radiation Lab. Report UCRL-4836, September 1957), a different interferometer scheme is proposed using an electronic phase shifter first suggested by V. P. Ty*chinskiy (Radiotekhnika i elektronika v. 1, 12, 1525,

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ACCESSION NR: AT4025296

1956 and v. 3, 9, 1182, 1958). Among the advantages claimed for this interferometer version is the possibility of using any type of microwave generator (such as a magnetron), the elimination of the losses occurring in long lines, additional amplification of the microwave signal, and increased speed. The variation in plasma density can be calculated from the known change in the phase of the signal, using the formula

$$\Delta\varphi = \frac{2\pi \cdot d}{\lambda} \left[1 - \left(1 - \frac{n}{n_{kp}} \right)^{1/2} \right]$$

where d -- plasma diameter, λ -- wave length, n_{kp} -- critical concentration at which the microwave signal does not pass through the plasma ($n_{kp} = 3.12 \times 10^{-10} \omega^2$, where ω is the signal frequency). The equipment was tested with a plasma jet 3--5 cm in diameter and an electron density 10^{12} cm^{-3} . The phase deviation amounted to 2π

Card

2/3³

ACCESSION NR: AT4025296

and the lifetime of the plasma was 30--50 μ sec. Orig. art. has: 7 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 19Oct63

DATE ACQ: 16Apr64

ENCL: 02

SUB CODE: ME, EC

NR REF.SOV: 002

OTHER: 001

Card

3/5

9.4231

21602
S/109/60/005/010/025/031
E073/E482

AUTHORS: Akulina, D.K., Akhmanov, S.A., Gvozdover, S.D.,
Gorshkov, A.S. and Trofimenko, I.T.

TITLE: Parametric Phenomena in Wave Systems With Long Electron
Beams

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.10,
pp.1736-1739

TEXT: The phenomenon of parametric regeneration which was first investigated by L.I.Mandel'shtam and his associates (Ref.1) in systems with lumped constants may also occur in wave systems (Ref.2). The considerable interest in wave systems with modulated parameters is due to the prospects of building stable amplifiers and frequency converters with a very wide band which are simple to tune and are unidirectional. In principle, it is possible to obtain in the wave systems noise characteristics which are the same as those obtained in parametric circuit amplifiers. One of the possible variants of wave systems with modulated parameters are wave systems with long electron streams. First, a freely drifting beam of electrons represents a form of transmission line; modulation of the current density by a strong pump signal is

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Parametric Phenomena ...

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analogous to some extent to the modulation of the distributed parameters of a transmission line (Ref.3 and 4). Another example of a waveguide system in which the modulation of the density of the electron beam can lead to parametric effects is a system consisting of a beam of electrons linked with a delay system. Wave systems with long electron beams are at present one of the most suitable fields for studying parametric phenomena in wave systems, since it is difficult to produce purely distributed wave systems with semiconductors and ferrites. In this paper the results are briefly described of experiments on parametric amplification and transformation of the frequency in wave systems with long electron beams in which the interaction of the electrons with the high frequency field in the longitudinal direction is utilized (see also earlier work of the authors, Ref.5 and 6). The experiments were made in the centimetre ($f_c \approx 3000 - 3500$ Mc/s, frequency of $f_H \approx 6000$ Mc/s) and the decimetre ($f_c \approx 1000 - 1800$ Mc/s, $f_H \approx 3000 - 3500$ Mc/s) ranges. In the experimental set-up both the pump source and the signal were introduced into the electron beam by means of sections of helical lines. The main beam of the electrons first passed

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through the first helix in which it was modulated by the pump signal and then into the second part of the tube where it interacted with the signal. The interaction was realized either in a drift tube (for feeding in and for extracting the signal, small sections of helical lines were used) or in the helical line. The power of the pump signal at the input and the output of the first helix was monitored; measures were provided for filtering the pump signal on the indicating apparatus. The block schematic is given. The parametric amplification was clearly observed in systems of both types for powers of the pump source varying between 200 μ W and 1W. A common feature was the very wide band of the parametric amplification. Thus, in the decimetre range, the amplification was in a band of about 500 to 600 Mc/s with very little change in the gain for the band of the pump source of 200 to 300 Mc/s. In conclusion, the following is stated. Parametric amplification in wave systems with electron beams extends over a very wide band; for pump signal powers of 10 to 100 mW in systems with lengths not exceeding the dimensions of ordinary TWT, a real gain of about 20 db and more can be achieved. Comparison of the experimental data with results of Card 3/5

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calculations by W.Loissell and C.Quate (Ref.3 and 8) shows that the theory does not adequately explain the observed phenomenon. Firstly, disregarding of the combination frequencies is not justified and, secondly, various phenomena, as for instance the non-monotonic relationship between the coefficient of parametric amplification and the power of the pump source etc, are not explained by the work of Loissell. On the other hand, a number of experimental facts are in qualitative agreement with the theory; for instance, the selective properties of the investigated systems, the dependence of the coefficient of parametric amplification on the voltage of the beam for systems with a beam and a delay line. In the investigations described, no special measures were taken for picking up the noise energy; the minimum noise coefficient of the systems investigated was at the level of the noise of the appropriate travelling wave tubes. Even in their present state electron wave parametric systems may be of interest from the point of view of wide band mixing and division of frequencies. Acknowledgments are expressed to A.S.Tager for his comments on the results and to V.G.Dmitriyev and A.A.Ovsyannikov for their

Card 4/5

AKULINICHEV, I.

"Amplifiers Without Condensers," Radio, No. 3, 1949.

AKULINICHEV, I. T.

33477. Podvodnyye Kishechnyye Vanny I Ikh Lechebnoye Primeneniye. Klinich. Meditsina, 1949, Ne 10, C. 83-90. Bibliogr: C. 90

SO: Letopis' Zhurnal'nykh Statey, Vol. 45, Moskva, 1949

AKULINICHEV, I. T.

Significance of dynamic and vectrocardiographic investigations.
Klin. med., Moskva 29 no.8:44-50 Aug 51. (CJML 20:11)

AKULINICHEV, I.

USSR/Electronics - Diodes

Card 1/1 : Pub. 89 - 20/26

Authors : Akulinichev, I., Moscow Region

Title : Germanium diode synchronization

Periodical : Radio 12, page 42, Dec 1954

Abstract : A pulse synchronization system, used by the author in a television receiver of his own design, exhibited at the Moscow Exhibition of Radio-Amateurs, is presented. The synchronizing pulses are separated by means of germanium diodes. Four diodes are used and the functions of each of these diodes, assembled in a system together with two pentodes, are explained. Circuit diagram.

Institution :

Submitted :

AKULINICHEV, I. T.

USSR/ Medicine - Physiology

Card 1/1 : Pub. 22 - 42/44

Authors : Babitskiy, Act. Memb. of Ukr. Acad. of Sc., and Akulinichev, I. T.

Title : Determination of the equivalent force of mechanical processes connected with the activity of the heart and circulation of blood in the vessels

Periodical : Dok. AN SSSR 98/1, 159-162, Sep 1, 1954

Abstract : A method used in determining the equivalent force of the mechanical processes connected with cardiac activity and blood circulation in vessels of the human body is described. Cardiohemodynamograms showing the cycles of healthy human hearts in various positions of the body are included. One USSR reference (1952 and 1953).

Institution :

Submitted : April 21, 1954

AKULINICHEV, I.

Television circuit for amateurs. Radio no.9:28-30 S'55. (MLRA 8:11)
(Television--Receivers and reception)

AKULINICHEV, I.T., podpolkovnik meditsinskoy sluzhby

Vector electrocardioscope. Voen-med. zhur. no.1:79-86 Ja '56
(MLRA 10:5)

(VECTOCARDIOGRAPHY, apparatus and instruments,
vecto-electrocardioscope) (Rus)

AKULINICHEV, Ivan Timofeyevich; RUBCHINSKIY, A.B., red.; BORUNOV, N.I., tekhn.
red.

[Amateur television set] Iambitel'skii televizor. Moskva, Gos. energ.
izd-vo, 1958. 46 p. (Massovaya radiobiblioteka, no.298)(MIRA 11:7)
(Television--Receivers and reception)

AKULINICHEV, I.T.; BABSKIY, Ye.B.; GEL'SHTEYN, G.G.; PETROV, G.M.; SKACHKOVA, A.I.;
~~UTY, N.I.~~; USHAKOV, V.B.

Electronic modeling of the electric activity of the heart. Biofizika,
4 no.3:354-360 '59. (MIRA 12:7)

1. Nauchno-issledovatel'skiy institut schetnogo mashinostroyeniya,
Institut grudnoy khirurgii AMN SSSR, Moskva i Institut normal'noy i
patologicheskoy fiziologii AMN SSSR, Moskva.

(ELECTROCARDIOGRAPHY,

electronic model of electric activity of heart (Rus))

AUTHOR:

Akulininichev I.

SOV/107-58-10-26/55

TITLE:

A 3-D Oscilloscope (Trekhnernyy ostsilloskop)

PERIODICAL:

Radio, 1958, Nr 10, pp 27-30 (USSR)

ABSTRACT:

The author is the creator of the vectorelectrocardioscope, and has now perfected an instrument, which he has named "a 3-D oscilloscope", which records three projections of the electrocardiogram on the screen simultaneously. The komitet po delam izobreteniy i otkrytiy pri Sovete Ministrov SSSR (Committee for Affairs Concerned with Inventions and Discoveries of the Council of Ministers of the USSR) has granted the author an author's certificate for this instrument and recommended it to the Health Ministry of the USSR "for industrial realization". It was first demonstrated publicly at the 15th All-Union Radio Exhibition. The instrument is designed for the simultaneous registration on one screen of three processes, with scanning in time; besides this it can also record three spatial projections of vectorcardiograms simultaneously on one screen, and thus give a good illustration of their natural interdependency. An electronic beam is "split", i.e. fixed in turn on three definite points on the screen, by a special switching device; while the beam is being

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A 3-D Oscilloscope

SOV/107-58-10-26/55

switched over the tube is cut off. At the moment when the beam is on any one of these points it is guided by one of the three electrical signals corresponding to the biocurrents of the heart. The author gives a detailed description of the working of this instrument, which has 36 valves, 16 semiconductor diodes, is housed in a metal case 32 x 25 x 44 cm, and weighs (without the photocamera) 17 kg. There are 2 circuit diagrams and 1 illustration.

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SOV/107-59-3-19/52

9 (4)

AUTHOR: Akulinichev, I., Physician - Radio Amateur

TITLE: Serving the Health of Men (Na sluzhbe zdorov'ya cheloveka)

PERIODICAL: Radio, 1959, Nr 3, p 21 (USSR)

ABSTRACT: The author points out the importance of local DOSAAF radio clubs for the creative work of radio amateurs. He himself designed and built an vectorelectrocardioscope for the diagnosis of heart diseases, which can show the electrical activity of a heart on a screen with a long afterglow. The industrial models were produced in cooperation with engineers from the Zavod eksperimental'noy meditsinskoy apparatury-EMA (Plant for Experimental Medical Apparatus - EMA). Three models of the vectorcardioscope were created in recent years and doctors all over the USSR and the Soviet bloc are using it by now. There are other instruments in which two or even four electron-ray tubes

Card 1/2

AKULINICHEV, I.T.; BARSKIY, Ye.B.; GEL'SHTEYN, G.G.; LAKUNIN, N.B.;
MOSKALENKO, G.V.; PETROV, G.M.; USHAKOV, V.B.

~~Cardiocyelography~~. Biofizika 4 no. 4:490-495 '59. (MIRA 14:4)

1. Nauchno-issledovatel'skiy institut schetnogo mashinostroyeniya,
Institut grudnoy Khirurgii AMN SSSR i Institut normal'noy i
patologicheskoy fiziologii AMN SSSR, Moskva.
(ELECTROCARDIOGRAPHY)

AKULINICHEV, I.T.; BABSKIY, Ye.B.; GEL'SHTEYN, G.G.; PETROV, G.M.;
SKACHKOVA, A.I.; UTEY, N.I.; USHAKOV, V.B.

Reproduction of the electrocardiogram by an electronic model system.
Biofizika 4 no.5:589-594 '59. (MIRA 14:6)

1. Iz otdela elektromodelirovaniya Nauchno-issledovatel'skogo
instituta schetnogo mashinostroyeniya, Instituta grudnoy khirurgii
AMN SSSR i laboratorii klinicheskoy fiziologii Instituta normal'noy
i patologicheskoy fiziologii AMN SSSR, Moskva.
(ELECTROCARDIOGRAPHY)

AKULINICHEV, Ivan Timofeyevich; KYANDZHUNTSEVA, E.A., red.; ZUYEVA,
N.K., tekhn. red.

[Practical problems in vectorcardioscopy] Praktichaskie vop-
rosy vektorkardioskopii. Moskva, Medgiz, 1960. 213 p.

(MIRA 15:4)

(VECTORCARDIOGRAPHY)

AKULINICHEV, I., vrach.

A physicians word about television. Radio no.3:39 Mr '60.
(MIRA 13:6)

(Television)

AKULINICHEV, I:

Cooperation of physicians and engineers. NTO 2 no.6:36-37 Je '60.
(MIRA 14:2)

1. Zamestitel' predsedatelya seksii meditsinskoy radioelektroniki
TSentral'nogo pravleniya Nauchno-tekhnicheskogo obshchestva imeni
A.S.Popova. *Secret (Russia)* *UNORIE (A-U Sec Tech Soc Radio Eng)*
(Electronics in medicine) *in Report*

AKULINICHEV, I., vrach

Radioelectronics and space medicine. Vest. Vozd. Fl. no.9:95-97
S '61. (MIRA 14:11)
(Space medicine)

AKULINICHEV, Ivan Timofeyevich; TROITSKIY, L.V., red.; VORONIN,
K.P., tekhn. red.

[Television receiver for radio amateurs] Liubitel'skii
televizor. Izd.2. Moskva, Gosenergoizdat, 1962. 55 p.
(Massovaia radio biblioteka, no.391) (MIRA 16:5)
(Television—Receivers and reception)

AKULINICHEV, I. [Akulinychev, I.], kand, med. nauk; AGADZHANYAN, M.,
~~kand. med. nauk~~

Space biotelemetry. Znan. ta pratsia no.3:14-15 Mr '62.
(Aerospace telemetry) (MIRA 16:7)

40466

S/029/62/000/009/001/002
D037/D113

27.4000

also 4312

AUTHORS: Agadzhanian, N., Candidate of Medical Sciences and Akulininichev, I.,
Doctor of Medical Sciences

FILE: Space biotelemetry

PERIODICAL: Tekhnika molodezhi, no. 9, 1962, 25 - 26

TEXT: The physical principles of biotelemetry and various types of biotelemetric equipment are described. Particular reference is made to the equipment used for recording; transmitting and storing information on the physical condition of astronauts Popovich and Nikolayev during their recent group-concerted flight. During this flight, several physical parameters were simultaneously recorded; special silver electrodes used for this purpose are described. Spaceships "Vostok-3" and "Vostok-4" were equipped with a device for recording all data during descent and an independent unit for registering the astronauts' pulse and respiration after departure from the cabin. There are 4 figures and 1 table. K

Card 1/1

S/865/62/001/000/033/033
E028/E485

AUTHORS: Agadzhanyan, N.A., Akulynichev, I.T., Zazykin, K.P.
Maksimov, D.G.

TITLE: A method of fixation of electrodes for the recording
of the electrocardiogram during human space flights

SOURCE: Problemy kosmicheskoy biologii. v.1. Ed. by
N.M.Sisakyan. Moscow, Izd-vo AN SSSR, 1962. 451-459

TEXT: Types of electrodes for recording the electrocardiogram during space flights and methods of attaching them to the body were studied by the authors in experiments carried out on themselves and on 12 volunteers. Silver discs, 10 to 20 mm in diameter and 0.3 to 0.5 mm thick, gave good electrical contact with the least irritation to the skin. The edges were rounded and the undersurface was cupped in order to retain a layer of conducting paste. This consisted generally of sodium chloride, glycerol, lanoline and antiseptics and was best applied as a liquid layer to the skin and as a semisolid layer to the electrode. The electrodes were attached to the chest either by a covering of gauze which was fixed in position with glue, or by means of an
Card 1/2

A method of fixation ...

S/865/62/001/000/033/033
E028/E485

elastic harness. These 2 methods of fixation were used in the respective flights of Gagarin and Titov. During the first few days after attachment the interelectrode resistance ranged from 5000 to 40000 ohms; after 10 to 14 days the resistance had risen 5 to 7-fold. There are 4 figures and 2 tables.

Card 2/2

AKULINICHEV, I., doktor med. nauk; BAYEVSKIY, R., kand. med. nauk

Automatic processing of medical information. Radio no.7:23-24
Jl '63. (MIRA 16:7)

(Electronic data processing—Medicine)

ACCESSION NR: AT4042642

S/0000/63/000/000/0006/0008

AUTHOR: Akulinichev, I. T.; Bayevskiy, R. M.; Belay, V. Ye. Vasil'yev, P. V.; Gazenko, O. G.; Kakurin, L. I.; Kotovskaya, A. R.; Maksimov, D. G.; Mikhaylovskiy, G. P.; Yazdovskiy, V. I.

TITLE: Results of physiological investigations aboard the "Vostok-3" and "Vostok-4" spaceships

SOURCE: Konferentsiya po aviatsionnoy i kosmicheskoy meditsine, 1963. Aviatsionnaya i kosmicheskaya meditsina (Aviation and space medicine); materialy* konferentsii. Moscow, 1963, 6-8

TOPIC TAGS: biomedical monitoring, electrooculogram, pneumogram/Vostok-3, Vostok-4, EEG, EKG

ABSTRACT: A number of physiological indices were monitored during the tandem spaceflights of Nikolayev and Popovich (Vostok-3 and Vostok-4). New procedures used for the first time on these flights and improvements of existing equipment yielded a great deal of physiological information. Weightless-
Card 1/5

ACCESSION NR: AT4042642

ness had no noticeable effect on the functional state of the CNS in either cosmonaut, as evaluated on the basis of performance of various tasks. EEG's showed a dominance of comparatively high-amplitude rhythms with a frequency of 5 to 7 cps, similar to those observed in athletes after intense physical exertion, during the first hours of weightlessness. Later a gradual shift toward beta-rhythms with a reduced mean amplitude of EEG biopotentials occurred. Heightened emotional stress in the first hours of flight and before reentry was reflected in decreased electrical resistance of the cortex. Functional stability of the higher involuntary nervous centers is indicated by the maintenance of normal daily variation of cortical resistance--higher at night, lower during the daytime--during the rest of the flights. EOG's (electrooculograms) were used as an index of the functional state of the vestibular apparatus. Asymmetries in oculomotor reaction, which could have indicated disturbances of the vestibular centers, were not observed in either cosmonaut. Vestibular tests not supplemented by EOG's also failed to yield any evidence of vestibular disturbance. Oculomotor activity was also used as an index of general and motor activity. Variations in oculomotor activity had a phase character. At the beginning of the flight Nikolayev, and to

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ACCESSION NR: AT4042642

a lesser degree Popovich, showed an increase of oculomotor activity up to 4 to 6 eye movements per second. Eye movements of an uncoordinated character, of both large and small amplitude, were recorded. On the 6th and 7th orbits eye movement fell off, and later EOG's show periodic increases and decreases in oculomotor activity. Toward the end of the flight a second stable increase in oculomotor activity occurred, but its level was lower than at the beginning of the flight. Cardiac activity was monitored by EKG's (using chest leads). Increased pulse rates (from 98 to 112 for Nikolayev, and from 94 to 136 for Popovich) occurred immediately before launch, with corresponding shortening of the PQ and QT intervals. EKG changes during the powered-flight phase were similar to those observed in ground experiments with centrifuging. The maximum pulse rate during the first minute of flight was 136 for Nikolayev and 132 for Popovich. Normalization of pulse rates to the rates observed 4 hr before launch took place on Nikolayev's 6th and 7th orbit and on Popovich's 3rd to 4th orbit. Normalization of pulse to initial rates took 5 to 10 min during tests. No EKG changes indicating disturbances of automatism, excitability, or conductivity were observed. In flight Popovich registered 3 separate extra

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ACCESSION NR: AT4042642

systoles; this had also occurred during training tests. The character of daily variation of cardiac activity remained unchanged. Pneumographic data revealed no respiratory irregularities. Some increase in respiration rate was noted during the powered-flight phase; this had also been observed during centrifuge tests. No pathological change in physiological functions of either cosmonaut was observed during flight. During the powered-flight phase, functional shifts similar to those observed during centrifuge tests occurred. Definite changes in the functional state of various physiological systems took place during the first hours of orbital flight, as indicated by the inhibition of pulse-rate normalization and the character of EEG and cortical resistance changes. Changes in the character of EEG's during prolonged (3 to 4 days) weightlessness indicate shifts in the interaction of excitation-inhibition processes in the higher levels of the CNS. However, the mental activity and neuro-regulatory functions of the cosmonauts remained at a high level.

ASSOCIATION: none

Card 4/5

L 1062-66 EWT(d)/FED/ENT(1)/FS(v)-3/EEG(k)-2/EED-2 RD/GW

ACCESSION NR: AR5006997

S/0275/65/000/001/VO10/VO10
621.38:629.196.4

SOURCE: Ref. zh. Elektronika i yeye primeneniye. Sv. t., Abs. 1 V59

AUTHOR: Akulichev, I. T.; Bayevskiy, R. M.; Danilov, V. G.; Yazdovskiy, V. I.

TITLE: Biotelemeter systems in astronautics

CITED SOURCE: Sb. Radiotelemetriya v fiziol. i med., Sverdlovsk, 1963, 10-13

TOPIC TAGS: biotelemeter 4

TRANSLATION: The biotelemeter monitoring of many-day astron^uatic flights is based on a continuous presence of all sensors and electrodes on the astronaut during the flight and on an automatic control of the shipborne equipment. Eighteen parameters were investigated: electrocardiogram, pneumogram, electric myogram, body temperature, photocardioqram, air pressure, air humidity, air temperature, O₂ content, CO₂ content, etc. TV observation, radiocommunication, and cosmic-radiation monitoring were added to the above measurements. It is believed that the medical-monitoring biotelemeter systems will be developed on the basis of dynamic telemetry and automatic tracking of medical parameters produced by

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L 1062-66

ACCESSION NR: AR5006997

detachable sensors and electrodes and also on the basis of biological indication. Use of ingrown telemeter systems is planned. In the future, medical monitoring will be needed during the landing on the planets. Apparently, a "long-distance" dynamic telemetry consisting of a radio link, astronaut suit, ship will be used. The use of biotelemetry is expected in the systems of astronaut radio link intentional and spontaneous biological controls.

SUB CODE: AC, EC

ENCL: 00

Card 2/2

DP

AKULINICHEV, I. T.

"Engineering psychological problems."

report submitted for 15th Intl Astronautical Cong, Warsaw, 7-12 Sep 64.

AKULINICHEV, Ivan Timofeyevich; BAYEVSKIY, Roman Markovich;
ZAZYKIN, Konstantin Pavlovich; FREYDEL', Vladimir
Rafailovich; KLEVTSOV, M.I., red.; LARIONOV, G.Ye., tekhn.red.

[Radio electronics in space medicine] Radioelektronika v kos-
micheskoi meditsine. Moskva, Izd-vo "Energia," 1964. 43 p.
(Massovaia radiobiblioteka, no.505). (MIRA 17:4)

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

ACCESSION NR AT5013042

Methods of

Answer: 12.105

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U. 115-10

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ACCESSION NR: AP4012881

S/0248/64/000/002/0060/0066

AUTHOR: Akulinichev, I. T. (Moscow); Bayevskiy, R. M. (Moscow)

TITLE: Use of radiotelemetry in space medicine

SOURCE: AMN SSSR. Vestnik, no. 2, 1964, 60-66

TOPIC TAGS: radiotelemetry, cosmonaut, Nikolayev, orbital flight, electrocardiography, Vostok 3, Vostok 4

ABSTRACT: A sketchy review of the latest experiments in space medicine is given in the light of modern space communication techniques. Future conceivable paths of the development and perfection of these tests are discussed. Those tests already conducted, particularly Nikolayev's orbital flight, are described in detail. The following Soviet studies and achievements are mentioned: electrodes which can remain fixed for 3-5 days on the spaceman's body without impeding his activity or irritating him, thus providing a quality EKG record; a simultaneous monitoring of two parameters over a single telemetric channel; the development, adjustment, and refinement of compact, multichannel, highly sensitive and dependable telemetric bio- and physiological testing equipment. The Vostok-3 and -4 cockpit physiological equipment is specified in minute detail; samples of Nikolayev's test data are

Card: 1/2

ACCESSION NR: AP4012881

given; and suggestions are made for data processing techniques. Orig. art. has:
4 figures.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 02Mar64

ENCL: 00

SUB CODE: AM

NO REF SOV: 000

OTHER: 000

Cord

2/2

AKULINICHEV, I.T.; ANDREYEV, L.F.; BAYEVSKIY, R.M.; BAYKOV, A.Ye.; BUYLOV, G.G.
GAZENKO, O.G.; GRYUNTAL', R.G.; ZAZYKIN, K.P.; KLIMENTOV, Yu.F.;
MAKSIMOV, D.G.; MERKUSHKIN, Yu.G.; MONAKHOV, A.V.; PETROV, A.P.;
RYABCHENKOV, A.D.; SAZONOV, N.P.; UTYAMYSHEV, R.I.; FREYDEL', V.R.;
KHIL'KEVICH, B.G.; SHADRINTSEV, I.S.; SHEVANDINA, S.B.; ESAULOV,
N.G.; YAZDOVSKIY, V.I.

Method and means of medical and biological studies in a space
flight. Probl. kosm. biol. 3:130-144 '64. (MIRA 17:6)

AKULINICHEV, I., doktor med. nauk

Amplifiers with automatic control of the operation of transistors.
radio no.6:39-40 Je '64. (MIRA 17:10)

AKULINCHEV, I.T.; BAYEVSKIY, R.M. (Moskva)

Use of radiotelemetry in space medicine. Vest. AMN SSSR 19 no 2:
60-66 '64. (MIRA 18:1)

L 20725-65 EEO-2/EWP(m)/EW(a)/EW(c)/EW(f)/EW(r)/EW(k)-2/EWP(r)/EW(r)/

AUTHOR: Akulichev, I. I.; Bayevskiy, R. M.

TITLE: Conditions of prolonged space flight ✓

SOURCE: Aviatsiya i kosmonavtika, ⁴⁷⁵no. 11, 1964, 33-36 B

TOPIC TAGS: prolonged isolation, prolonged space flight, interplanetary flight, space medicine, space biology

Card 1/2

"APPROVED FOR RELEASE: 06/05/2000

CIA-RDP86-00513R000100720015-5

APPROVED FOR RELEASE: 06/05/2000

CIA-RDP86-00513R000100720015-5"

AKULINICHEV, I., doktor med. nauk

Radio electronics in the health service. Radio no.3:10-11
Mr '65. (MIRA 18:6)

VOLYNKIN, Yu.M.; ARUTYUNOV, G.A.; ANTIPOV, V.V.; ALTUKHOV, G.V.;
 BAYEVSKIY, R.M.; BELAY, V.Ye.; BUYANOV, P.V.; BRYANOV, I.I.;
 VASIL'YEV, P.V.; VOLOVICH, V.G.; GAGARIN, Yu.A.; GENIN, A.M.;
 GORBOV, F.D.; GORSHKOV, A.I.; GUROVSKIY, N.N.; YESHANOV, N.Kh.;
 YEGOROV, A.D.; KARPOV, Ye.A.; KOVALEV, V.V.; KOLOSOV, T.A.;
 KORESHKOV, A.A.; KAS'YAN, I.I.; KOTOVSKAYA, A.R.; KALIBERDIN,
 G.V.; KOPANEV, V.I.; KUZ'MINOV, A.P.; KAKURIN, L.I.; KUDROVA,
 R.V.; LEBEDEV, V.I.; LEBEDEV, A.A.; LOBZIN, P.P.; MAKSIMOV,
 D.G.; MYASNIKOV, V.I.; MALYSHKIN, Ye.G.; NEUMYVAKIN, I.P.;
 ONISHCHENKO, V.F.; POPOV, I.G.; PORUCHIKOV, Ye.P.; SIL'VESTROV,
 M.M.; SERYAPIN, A.D.; SAKSONOV, P.P.; TERENT'YEV, V.G.; USHAKOV,
 A.S.; UDALOV, Yu.F.; FOMIN, V.S.; FOMIN, A.G.; KHLEBNIKOV, G.F.;
 YUGANOV, Ye.M.; YAZDOVSKIY, V.I.; KRICHAGIN, V.I.; AKULNICHEV,
I.T.; SAVINICH, F.K.; STMPURA, S.F.; VOSKRESENSKIY, O.G.;
 GAZENKO, O.G., SISAKYAN, N.M., akademik, red.

[Second group space flight and some results of the Soviet
 astronauts' flights on "Vostok" ships; scientific results of
 medical and biological research conducted during the second
 group space flight] Vtoroi gruppovoi kosmicheskii polet i neko-
 torye itogi poletov sovetskikh kosmonavtov na korabliakh
 "Vostok"; nauchnye rezul'taty medikobiologicheskikh issledovaniy,
 provedennykh vo vremia vtorogo gruppovogo kosmicheskogo poleta.
 Moskva, Nauka, 1965. 277 p. (MIRA 18:6)

1. The first part of the document is a list of references. The references are as follows:

1. "The First Part of the Document is a List of References. The references are as follows:

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3-65

SESSION NR: AF5007775

ASSOCIATION: none

[illegible][illegible]

Card 3 / 3

L 22873-66 FSS-2/EWT(1)/EEC(k)-2/EWA(d) TT/RD/GW
ACC NR: AP6012836 SOURCE CODE: UR/0293/66/004/002/0311/0319

AUTHOR: Akulichev, I. T.; Antoshchenko, A. S.; Znachko, V. A.;
Ivanov, A. Ye.; Lebedev, V. I.; Maksimov, D. G.; Uglov, A. Ye.;
Khlebnikov, G. F.

ORG: none

TITLE: Some results of monitoring the medical condition of P. I. Belyayev and A. A. Leonov during training and during orbital flight

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 2, 1966, 311-319

TOPIC TAGS: manned spaceflight, cosmonaut training, pressure chamber, human physiology, EVA / Voskhod-2

ABSTRACT: Training data for Leonov and Belyayev were compared with data from the Voskhod-2 flight. The cosmonauts were trained for rarefied atmosphere conditions by sequential exposure to pressure chamber altitudes of 5, 10, and 32-37 km. At an altitude of 5 km, neither cosmonaut required high altitude equipment or supplementary oxygen. At an altitude of 10 km, they breathed pure oxygen. In a rarefied atmosphere of 32-37 km, the cosmonauts wore suits analogous to those used on the Voskhod-2 flight. Flight system sensors and a stationary electrophysiological recorder were used. Pulse rate,

Card 1/8

UDC: 629.198.61

L 22873-66

ACC NR: AP6012836

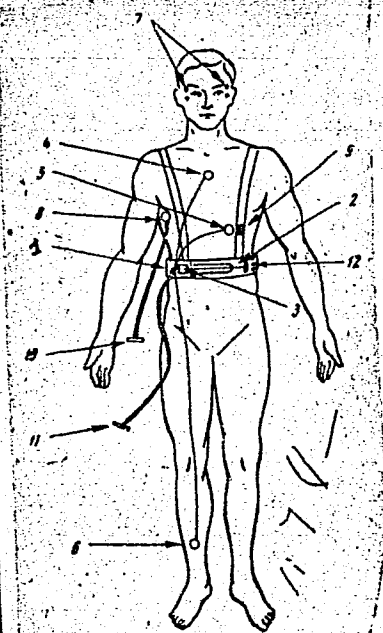


Fig. 1. Position of physiological sensors on the cosmonaut.

1 - Individual system of electrode and sensor positioning; 2 - ohmic respiration sensor; 3 - contact respiration sensor; 4, 5 - EKG electrodes; 6 - ground; 7 - EOG electrodes; 8 - body temperature sensor (submuscular area, Leonov only); 9 - SCG sensor; 10, 11 - detachable terminals; 12 - lacing.

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L 22873-66

ACC NR: AP6012836

Table 1. Changes in some physiological indexes of Belyayev and Leonov during space suit tests at 36km

Index	Belyayev			Leonov		
	Before	36 km	After	Before	36 km	After
Pulse rate, min.	12	9-18	12-28	16	12-18	12
Resp. rate, min.	67	60-67	62	63	67-68	57
P-Q, sec.	0,20	0,16-0,20	0,18	0,12	0,12-0,14	0,12
Q-R, sec.	0,10	0,08-0,10	0,10	0,08	0,05-0,06	0,06
Q-RS, sec.	0,40	0,40	0,40	0,32	0,32-0,36	0,36
Systolic index, %	42	40-42	40	33	33-41	36
P, mm	1	1	1	1	0,5-0,8	Weak
R, mm	9	11	8	22	19-23	15
S, mm	0,5	Weak	0,5	6,5	4	2
T, mm	5	3-4	3	6	4-6,5	3,5

Card 3/8

L 22873-66

ACC NR: AP6012836

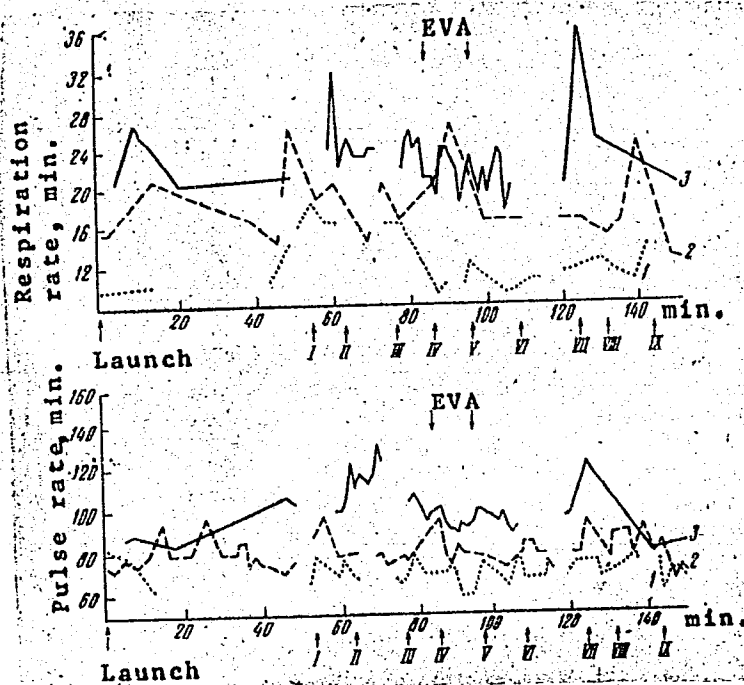


Fig. 2. Changes in the pulse and respiration rate of Belyayev when training and during the Voskhod-2 flight

I - Leonov entering the pressure lock; II - closing the cabin hatch; III - opening the pressure lock hatch; IV - Leonov's egress or imitated egress from the pressure lock; V, VI - Leonov's simulated or actual EVA; VII - Leonov's return to the cabin; VIII - closing the cabin hatch; IX - spacesuit pressure normalization to cabin atmosphere. 1 - training in a normal atmosphere; 2 - training at 37 km; 3 - orbital flight

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L 22873-66

ACC NR: AP6012836

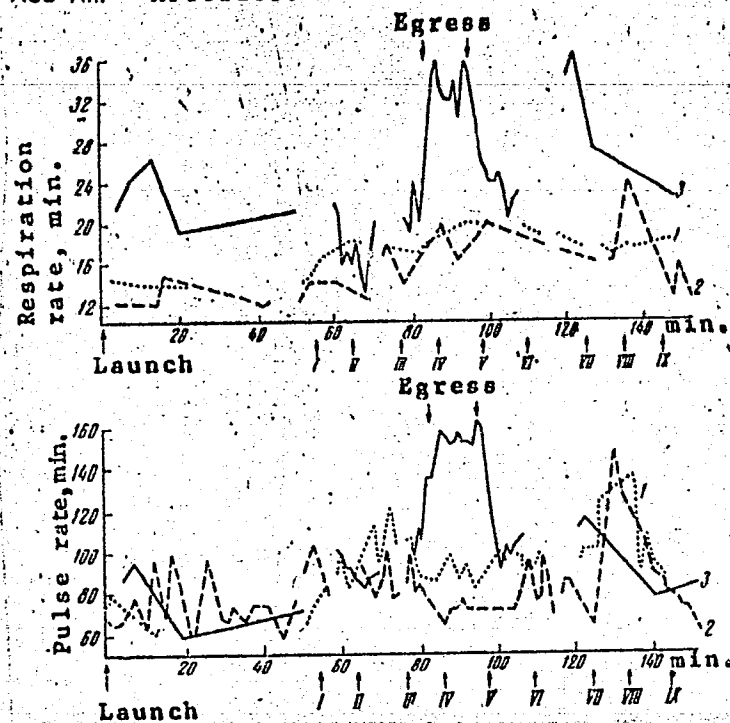


Fig. 3. Changes in the pulse and respiration rate of Leonov when training and during the Voskhod-2 flight

I - Leonov entering the pressure lock; II - closing the cabin hatch; III - opening the pressure lock hatch; IV - Leonov's egress or imitated egress from the pressure lock; V, VI - Leonov's simulated or actual EVA; VII - Leonov's return to the cabin; VIII - closing the cabin hatch; IX - spacesuit pressure normalization to cabin atmosphere. 1 - training in a normal atmosphere; 2 - training at 37 km; 3 - orbital flight

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L 22873-66

ACC NR: AP6012836

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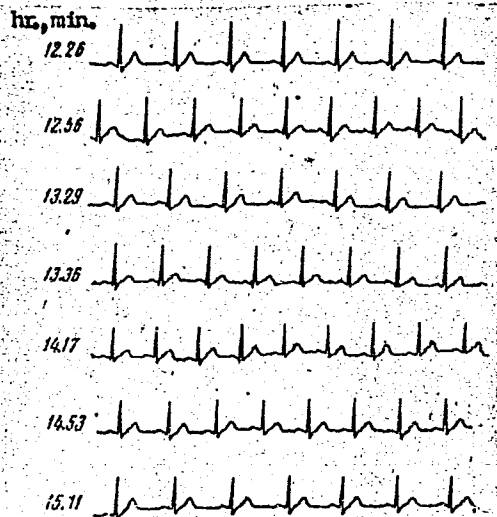


Fig. 4. Belyayev's EKG's when rehearsing the flight program in the spacecraft mockup (exercise no. 2, 37 km)

12.26 - normal condition; 12.56 - instrument check; 13.29 - prior to Leonov's entrance into the pressure lock; 13.36 - opening the cabin hatch; 14.17 - imitation of the egress; 14.53 - Leonov's return to the cabin; 15.11 - after the egress program and normalization of suit pressure

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L 22873-66

ACC NR: AP6012836

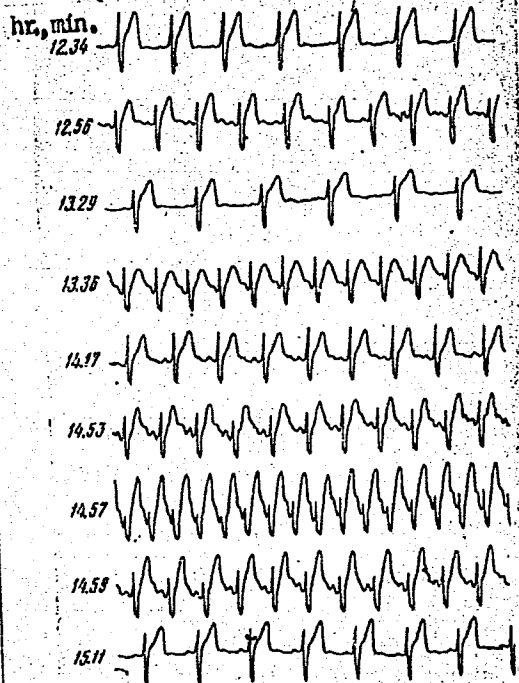


Fig. 5. Leonov's EKG's when rehearsing the flight program in the spacecraft mockup (exercise no. 2, 37 km)

12.34 - normal condition; 12.56 - instrument check; 13.29 - prior to entering the pressure lock; 13.36 - opening the cabin hatch; 14.17 - imitation of egress; 14.53 - return to the cabin; 14.57 - closing the cabin hatch; 14.59 - instrument check; 15.11 - after returning to the seat and normalizing suit pressure

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L 22873-66

ACC NR: AP6012836

respiration rate, and EKG's were recorded along with visual (TV) observations. Two-way radio communication was maintained. A space-craft mockup was used to test two series of exercises. In the first exercise, the cosmonauts rehearsed the program involving the movement of Leonov into the pressure lock under normal atmospheric conditions. The second exercise entailed the same regimen at an altitude of 37 km. A diagram of the sensors used is shown in Fig. 1. Results of the tests are given in Figs. 2—5 and Table 1. All Voskhod-2 systems and the newly designed suit used for Leonov's EVA functioned normally both during the training program and the flight itself. During training and the Voskhod-2 flight, the pressurization and egress program caused accelerated pulse and respiration rates and functional EKG variations in both cosmonauts. These were attributed to emotional stress, and in Leonov's case, physical strain. The training program was judged to be fully applicable to the Voskhod-2 program. Orig. art. has: 1 table and 5 figures. [CD]

SUB CODE: 05, 06/ SUBM DATE: 01Nov65/ ORIG REF: 006/ ATD PRESS: 4234

Cord 8/8 LC

L 08276-67. ESS-2/INT(A)/SEC(A)-2 SCIN TT/00/00/00

ACC NR: AT6036472

SOURCE CODE: UR/0000/66/000/000/0018/0019

b1
b7c

AUTHOR: Agulinichev, I. T.; Baykov, A. Ye.; Vasil'yev, P. V.; Kas'yan, I. I.; Maksimov, D. G.; Uglov, A. Ye.; Chekhonadskiy, N.A.

ORG: none

TITLE: Some data from electrophysiological investigations conducted on the crew of the Voskhod-2 during spaceflight (Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24-27 May 1966)

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 18-19

TOPIC TAGS: space physiology, manned space flight, Leonov, extravehicular activity, cardiology, cardiovascular system, electrooculogram, electrocardiogram, body temperature, electrophysiology, respiration, heart rate / Voskhod-2

ABSTRACT:

Electrocardiograms, pneumograms, seismocardiograms, and electro-oculograms were registered on the Voskhod-2 cosmonauts, Belyayev and Leonov. In addition, Leonov's body temperature was measured. After the spaceship attained orbit, the frequency of cardiac contractions continued to increase and to exceed the levels registered

Cord 1/3

L 08276-67- -

ACC NR: AT6036472

during active acceleration. These changes in pulse rate were due to the preparations for Leonov's EVA. During EVA, their heart rates reached the maximums of 129 and 162 beats/min. By the third orbit, the heart rate and respiration frequencies of the two cosmonauts became normal, equaling prelaunch magnitude. Further changes were comparable to those noted in preceding flights. The lowest heart rates were recorded during the seventh orbit. From the thirteenth to the eighteenth orbit there was a gradual increase in the rate of cardiac contractions (86—111) and an increase in respiration rate up to 18—20 cycles/min, which was related to the performance of a series of tasks according to the program, and to the emotional strain induced by preparation for manual re-entry.

Analysis of the EKG indicated that the significance of the Q—T and R—R intervals in both cosmonauts corresponded to changes in frequency of the heart rate. The lability of the Q—T coefficient was higher at the beginning and end of the flight in both cosmonauts and diminished noticeably during the middle of the flight. The same was observed in relation to the amplitude of the EKG peaks. The duration of the mechanical systole in general followed changes in pulse rate from the third to the sixteenth orbit; the duration of Leonov's mechanical systole varied from 0.32—0.35.

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sec. During the 17th and 18th orbits, the duration of the mechanical systole diminished to 0.29—0.27 sec simultaneously with an increase in the pulse rate. Electromechanical lag was determined only in Leonov and during various times of the flight varied from 0.02—0.06 sec.

Oculomotor activity during the first two orbits rose in both cosmonauts to 105—111 movements/min. During the third and fourth orbits the number of oculomotor reactions diminished and after that varied within relatively low limits: 10—40 movements/min. The dynamics of the electro-oculogram corresponded to changes in the pulse and respiration frequency and reflected, apparently, the general condition of the cosmonauts. An analysis of the amplitudes and the curve of the EOG indicated that eye movements in the cosmonauts were rather symmetrical during the entire duration of the flight.

Leonov's armpit temperature varied during the flight from 35—37.6° C. The higher temperatures were recorded during the 2nd, 16th, and the 17th orbits. This can be explained by emotional strain and performance of physical tasks by the cosmonaut. [W. A. No. 22; ATD Report 66-116]

SUB CODE: 06,22 / SUBM DATE: 00May66

Card 3/3 vmb

ACC NR: AP6033399

SOURCE CODE: UR/0293/66/004/005/0755/0767

AUTHOR: Volynkin, Yu. M.; Akulinichev, I. T.; Vasil'yev, P. V.; Voskresenskiy,
A. D.; Kas'yan, I. I.; Maksimov, D. G.

ORG: none

TITLE: Some data on the condition of cosmonauts during the flight of the Voskhod-1
spacecraft

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 5, 1966, 755-767

TOPIC TAGS: *manned spacecraft*
space physiology, space medicine, human physiology, cardiovascular
system, nervous system, vestibular analyzer/Voskhod 1 *spacecraft*

ABSTRACT: A diagram of the biomedical monitoring parameters and some results of a further statistical analysis of the Voskhod-1 flight are presented in the following figures and tables. As in other discussions of this flight, the general conclusion was that none of the observed physiological shifts were of a pathological nature, and therefore, were reversible. The most significant finding of the flight was a confirmation of the possible specific effect of weightlessness on the statokinetic

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UDC: 629.198.61

ACC NR: AP6033399

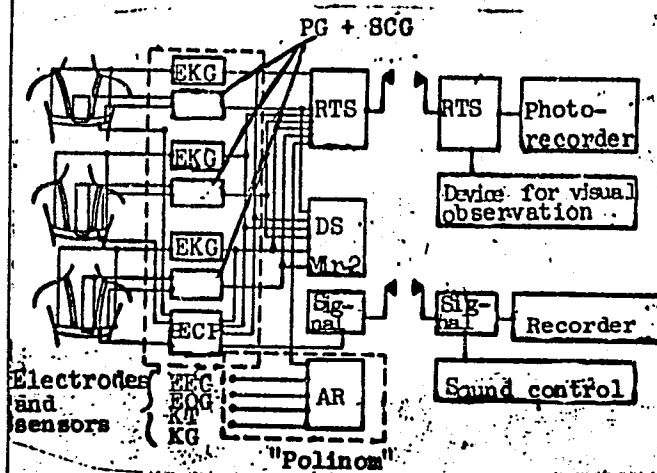


Fig. 1. Block diagram of physiological parameters recorded during the flight of Voskhod-1

EKG - Electrocardiogram; PG, SCG - pneumogram plus seismocardiogram; EEG - electroencephalogram; ECG - pulmo-electrocardiophone; EOG - electrooculogram; KT - coordination test; KG - kinetogram; RTS - radiotelemetry system; DS-Mir-2 - data storage unit; AR - amplifier-readout.

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ACC NR: AP6033399

Cosmonauts	Physiological index	Before flight						After flight	
		8.X	9.X	11.X	4 hr	5 min	10 min	1st day	15 th day
		1964			Pre launch	12.X 1968			
V. M. Komarov	Pulse	76	68	72	87	89	89	89	68
	Respiration	8	12	10	18	23	20	11	10
	Arterial pressure	115	115	120	—	—	—	115	115
K. A. Feoktistov	Pulse	75	70	75	—	—	—	80	75
	Respiration	80	84	80	78	86	97	84	72
	Arterial pressure	12	16	18	21	20	21	16	11
B. B. Yegorov	Pulse	110	105	125	—	—	—	105	115
	Respiration	75	75	85	—	—	—	85	80
	Arterial pressure	72	64	64	81	86	95	84	63
	Pulse	14	14	14	18	25	21	10	15
	Respiration	100	105	120	—	—	—	120	110
	Arterial pressure	70	65	70	—	—	—	80	68

Table 1. Dynamics of the pulse rate, respiration rate, and arterial pressure of the Voskhod-1 cosmonauts before, during, and after the flight (from the data of M. D. Nikitin et al).

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ACC NR: AP6033399

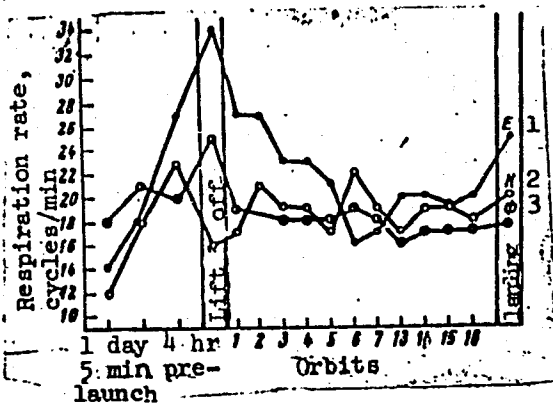


Fig. 2. Dynamics of the average respiratory rates of V. M. Komarov (2), K. P. Feoktistov (3), and B. B. Yegorov (1) before, during, and after the Voskhod-1 flight

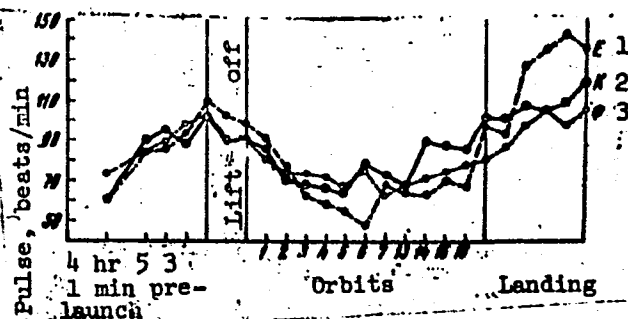


Fig. 3. Dynamics of the average pulse rates of B. B. Yegorov (1), V. M. Komarov (2), and K. P. Feoktistov (3), before, during, and after the Voskhod-1 flight

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ACC NR: AP6033399

Parameters.	Cosmonauts	2.5 hr before launch	Orbits											
			1	2	3	4	5	6	7	12	14	15	16	
P-Q, sec	V. M. Komarov	0,12	0,10	0,11	0,10	0,12	0,11	0,11	0,11	0,10	0,10	0,10	0,10	
	K. P. Feoktistov	0,15	0,14	—	0,13	0,16	0,13	0,16	0,14	0,11	0,12	0,12	0,12	
	B. B. Yegorov	0,12	0,12	0,12	0,13	0,13	0,14	0,14	0,16	0,10	0,12	—	0,10	
Q-T, sec	V. M. Komarov	0,34	0,34	0,37	0,36	0,37	0,38	0,35	0,38	0,39	0,36	0,34	0,34	
	K. P. Feoktistov	0,36	0,36	—	0,36	0,37	0,37	0,37	0,42	0,38	0,39	0,37	0,36	
	B. B. Yegorov	0,33	0,34	0,37	0,38	0,39	0,41	0,44	0,39	0,40	0,38	—	0,37	
R-R, sec	V. M. Komarov	0,69	0,61	0,78	0,70	0,83	0,99	0,61	0,76	0,89	0,71	0,72	0,75	
	K. P. Feoktistov	0,76	0,69	—	0,82	0,88	0,91	0,90	0,98	0,87	0,82	0,80	0,78	
	B. B. Yegorov	0,67	0,69	0,73	0,88	0,98	1,13	1,24	0,98	1,03	0,87	—	0,90	
Systolic, index	V. M. Komarov	49,9	57,7	48,7	51,7	43,7	40,0	58,2	30,7	45,0	51,1	47,2	45,3	
	K. P. Feoktistov	47,6	52,9	—	44,6	42,4	40,0	41,3	43,3	44,2	47,9	46,5	46,8	
	B. B. Yegorov	49,2	58,8	50,7	43,4	39,7	36,2	36,8	40,1	39,2	44,2	—	41,0	

Table 2. Some indices of the cardiac activity of V. M. Komarov (1), K. P. Feoktistov (2), and B. B. Yegorov (3) before and during the flight of Voskhod-1

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Orbits	V. M. Komarov			K. P. Feoktistov			B. B. Yegorov		
	M.sec	sec	C. %	M.sec	sec	C. %	M.sec	sec	C. %
5 min									
~ before	0,68	0,07	10,5	0,72	0,076	10,56	0,70	0,073	10,50
1	0,72	0,08	12,8	0,75	0,031	4,15	0,69	0,074	10,74
3	0,87	0,098	11,26	0,84	0,084	9,96	0,94	0,109	11,55
6	0,82	0,075	9,14	0,86	0,074	7,66	1,31	0,044	3,36
13	0,87	0,038	4,34	0,93	0,091	9,80	1,02	0,067	6,58
16	0,74	0,043	5,82	0,81	0,053	6,50	0,96	0,082	8,60

Table 3. Results of a statistical analysis of R-R intervals for V. M. Komarov (1), K. P. Feoktistov (2), and B. B. Yegorov (3) before and during the Voskhod-1 flight

analyzer and its interaction with other analyzers leading to the possible development of prolonged spatial disorientation illusions and prolonged vestibuloautonomic reactions which decrease the work capacity of cosmonauts. Orig. art. has: 4 figures and 4 tables.

SUB CODE: 06/ SUBM DATE: 26May66/ ORIG REF: 010/ OTH REF: 001/ ATD PRESS: 5100

Card 6/6

ACC NR: AT7011649

SOURCE CODE: UR/0000/66/000/000/0001/0009

AUTHOR: Akulichev, I. T.; Zhdanov, A. M.; Popov, I. I.

ORG: none

TITLE: Problems of biotelemetry during prolonged spaceflights

SOURCE: International Astronautical Congress. 17th, Madrid, 1966. Doklady.
no. 11. 1966. Problemy biotelemetrii v dlitel'nykh kosmicheskikh poletakh, 1-9

TOPIC TAGS: biotelemetry, manned space flight, human physiology,
space medicine, bioinstrumentation

ABSTRACT:

The selection of physiological, hygienic, and psychomotor parameters necessary for solving applied and research problems is one of the biggest problems confronting the manned spaceflight effort. Two contradictory situations render this problem more difficult: 1) High demand for medical information; 2) limited capacity of on-board radiotelemetric systems.

The problem of operational medical control of the condition of cosmonauts has been solved on the basis of

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ACC NR: AT7011649

dynamic analysis of a comparatively small number of preselected parameters. A more detailed analysis of health and working capacity can be realized through results of periodically programmed examinations of cosmonauts according to a program shown in this article and summarized as follows:

- 1) Operational medical control system results operating at a low continuous interrogation frequency and analyzed on board. Parameters include pulse rate, respiratory rate, body temperature, and cabin or space-suit pressure.
- 2) Periodic medical monitoring system operating at a high (A) or low (B) periodic; interrogation frequency with analysis taking place during communication periods. Parameters include cardiac bioelectricity (A), respiratory kinetograms (A), seismocardiograms (A), electro-oculography (A), cabin temperature (B), humidity (B), O₂ content (B), CO₂ content (B).
- 3) Working capacity tests conducted at a high (A) or low (B) periodic interrogation frequency with analysis taking place during communication periods. Parameters include coordination of movements (A), muscular strength (B), respiratory kinetogram (A), cardiac bioelectricity (A), electro-oculography (A), brain bioelectricity (A),

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ACC NR: AT7011649

skin galvanic reactions (A). 4) Psychophysiological tests conducted at high (A) or low (B) periodic interrogation frequency with analysis taking place during communication periods. Parameters include the monitoring of test stimulus duration (B), test stimulus intensity (A), test completion accuracy (A), reaction tendency (A), and skin galvanic reactions (A). 5) Circulatory system tests conducted at a high (A) and low (B) periodic interrogation frequency. Parameters include cuff pressure (B), arterial oscillations (A), Korotkov tones (A), electroplethysmograms (A), cardiac bioelectricity (A), respiratory kinetograms (A), and seismocardiograms (A). 6) Respiratory-function tests conducted at a high (A) and low (B) periodic interrogation frequency. Parameters include respiratory kinetograms (B), volumetric flow (B), rate of volumetric flow (B), cardiac bioelectricity (B), cabin O₂ content (B), cabin CO₂ content (B), cabin humidity (B), cabin pressure (B), and cabin temperature (B). 7) Vestibular tests conducted at a high (A) and low (B) interrogation frequency. Parameters monitored include stimulus duration (B), stimulus intensity (A), skin galvanic reactions (A), cardiac bioelectricity (A), electro-oculography (A), and brain bioelectricity (A).

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ACC NR: AT7011649

Block diagrams of the above systems are given in the following figures.

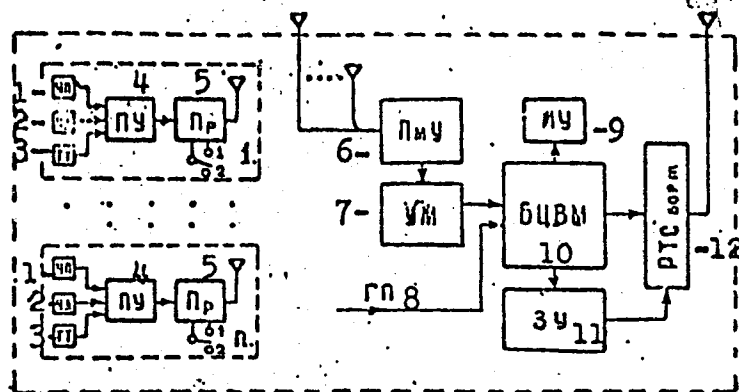


Figure 1. Functional diagram of an operational medical control system.
1. pulse rate; 2. respiration rate; 3. body temperature; 4. transducer-amplifier; 5. transmitter; 6. receiver; 7. power amplifier; 8. hygienic parameters; 9. readout gage;

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10. on-board digital computer; 11. data storage;
12. on-board component of the telemetry system.

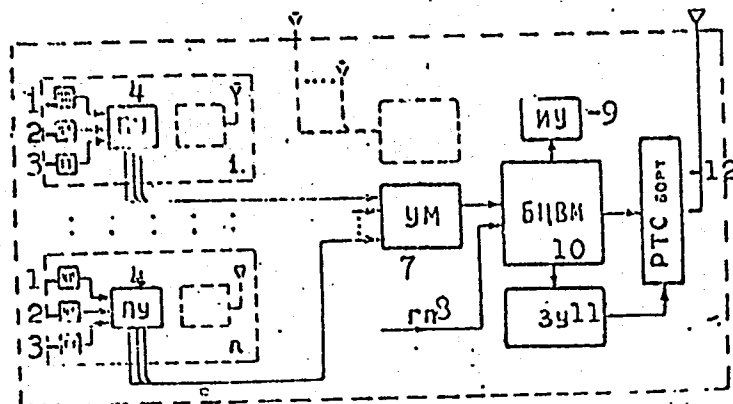


Figure 2. Functional diagram of an operational medical control system using a wired communication link between the cosmonaut and the on-board system.
1. pulse rate; 2. respiration rate; 3. body

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temperature; 4. transducer-amplifier; 5. transmitter; 6. receiver; 7. power amplifier; 8. hygienic parameters; 9. readout gage; 10. on-board digital computer; 11. data storage; 12. on-board component of the telemetry system

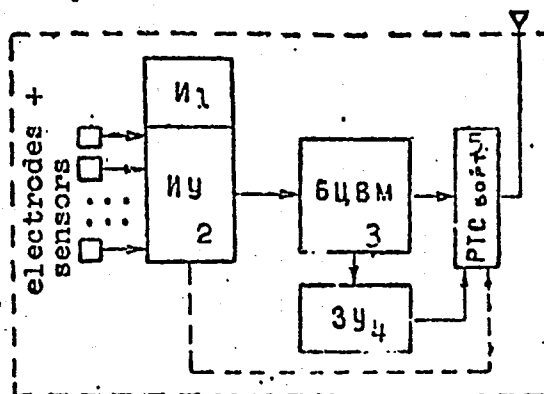


Figure 3. Functional diagram of a periodic medical examination and research system.
1. channel function readout; 2. measuring device; 3. on-board digital computer; 4. data storage; 5. on-board component of the telemetry system

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ACC NR: AT7011649

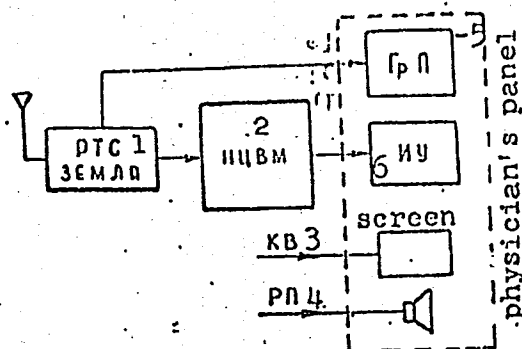


Figure 4. Earthside components of a medical control system.
 1. earthside telemetry system; 2. earthside digital computer; 3. space TV system; 4. radiocommunications (voice); 5. graph plotter; 6. readout gage

Future telemetry systems will have to consider extravehicular activity by cosmonauts during future prolonged spaceflights. Small-scale (on-board and near-vehicular) telemetry systems present many prob-

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ACC NR: AT7011649

lems. The theoretical and experimental foundations for the construction of such systems have not yet been worked out. Therefore, further experimental and theoretical research is necessary to determine radio-wave propagation characteristics in closed spaces (cabins) and to construct radio-channel equipment which will reliably transmit biotelemetric information. The first stage of the solution of this problem was the Voskhod-2 flight. Uncomplicated hardware was used to transmit Leonov's pulse and respiration data to Belyayev.

The miniaturization and microminiaturization of biotelemetric hardware has also not been fully solved. In view of its dimensions, equipment used thus far must be taken as a compromise. The first stage of microminiaturization was micromodule construction. The bio-amplifier system developed as a first step in microminiaturization was used on Voskhod-1 as the basic circuit of the research device used by B. B. Yegorov.

Present-day electrodes and sensors are insufficient for prolonged spaceflights and those which can be incorporated into cosmonaut clothing are needed. In general,

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ACC. NR: AT7011649

a multitude of problems confront space biometrics and telemetry. The author has mentioned only a few, the solution of which will have a pronounced effect in accelerating the progress of cosmonautics and in increasing the safety of prolonged manned spaceflights. Orig. art. has: 4 figures and 1 table. [ATD PRESS: 5098-F]

SUB CODE: 06 / SUBM DATE: none

Card 9/9

ACC NR: AP7005701

SOURCE CODE: UR/0216 /67/000/001/0104/0115

AUTHOR: Kas'yan, I.I.; Vasil'yev, P.V.; Maksimov, D.G.; Akul'nichev, I.T.; Uglov, A.Ye.; Baykov, A.Ye.; Chekhonadskiy, N. A.

ORG: none

TITLE: Some cardiovascular and respiratory system reactions of the cosmonauts during the orbital flight of the Voskhod-2 spacecraft

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no 1, 1967, 104-115

TOPIC TAGS: weightlessness, cardiovascular system, respiratory system, electrocardiography, psychologic stress, *SPACE PHYSIOLOGY*

ABSTRACT:

Cardiovascular and respiratory system data for A. A. Leonov and P. I. Belyayev monitored during the March 18, 1965 Voskhod-2 spacecraft flight and extravehicular excursion is analyzed. The significance of the R-R, PQ, QT and QRS intervals and the P, R, S and T-waves of the EKG's was determined. Pulse rate, respiration frequency, and systolic index were found on the basis of pneumogram data. The EKG and pneumogram data were mathematically processed for each orbit. Findings show that under conditions of weightlessness the general condition of the cosmonauts was not marked

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UDC: 612:523

AKULINICHEV, N.M.

Dynamic system linked with the distribution of fractional portions
of a second-degree polynomial. Dokl. AN SSSR 143 no.3:503-505 Mr
'62. (MIRA 15:3)

1. Matematicheskii institut im.V.A.Steklova AN SSSR. Predstavleno
akademikom I.M.Vinogradovym.
(Polynomials)(Numbers, Theory of)

AKULINICHEV, N.M.

Estimates of rational trigonometric sums of a special type.
Dokl. AN SSSR 161 no.4:743-745 Ap '65. (MIRA 18:5)

1. Submitted October 30, 1964.

AKULICHEV, V.A.; IL'ICHEV, V.I.

Spectral characteristics of the genesis of ultrasonic cavitation in water. Akust. zhur. 9 no.2:158-161 '63.
(MIRA 16:4)

1. Akusticheskiy institut AN SSSR, Moskva.
(Cavitation) (Ultrasonic waves)

BR

ACCESSION NR: APL025726

S/0046/64/010/001/0011/0014

AUTHORS: Akulichev, V. A.; Il'ichev, V. I.

TITLE: Interaction of ultrasonic waves with cavitation

SOURCE: Akusticheskiy zhurnal, v. 10, no. 1, 1964, 11-14

TOPIC TAGS: ultrasonic wave, cavitation, ultrasonic wave interaction

ABSTRACT: A series of experiments was carried out to investigate the interaction of ultrasonic waves with cavitation. The experimental arrangement, essentially the same for the entire series, consisted of a barium titanate ceramic transducer (producing frequencies f_1) in the form of a hollow cylinder. On its axis pressures could be obtained capable of producing cavitation in water. Small intensity sound waves (frequency f_2) were produced by a plane magnetostriction or piezoelectric transducer and were directed along the axis of the first transducer. A miniature barium titanate ceramic hydrophone was placed between the two, close to the region of cavitation. In the first experiment a standing ultrasonic wave with $f_1 = 21$ kc

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ACCESSION NR: AP4025726

produced cavitation which developed at a pressure of about 1 atm. With $f_2 = 1$ mc pressure about 10^{-3} atm, the obtained signal spectrum contained not only the components nf_1 ($n=1,2,\dots$) characterizing cavitation noise and f_2 but also combination components $f_2 \pm nf_1$. In particular, the amplitudes of $f_2 + f_1$ and $f_2 - f_1$ were equal and only 10 times smaller than that of f_2 . This interaction effect was not observed in the absence of cavitation. In the second experiment with $f_1 = 64$ kc and $f_2 = 24$ kc the pressure amplitudes of the combination waves as a function of the voltage applied to the cylindrical transducer were measured for several values of the pressure amplitude of f_2 . In all cases the combination wave amplitudes increased rapidly with the onset of cavitation, decreased somewhat, and then increased again with increasing voltage. In the third experiment with $f_1 = 62$ kc and $f_2 = 23$ kc the pressure amplitudes of additional combination waves $nf_1 \pm f_2$ ($n = 1,2,\dots,8$) were measured as a function of voltage. Each case showed roughly

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ACCESSION NR: AP4025726

the same form of variation: a rapid increase with the onset of cavitation and then a decrease with higher voltages. The authors thank V. V. Mal'kov and A. I. Nikitin for their help in performing the experiments. Orig. art. has: 10 equations and 3 diagrams.

ASSOCIATION: Akusticheskiy institut AN SSSR Moscow (Acoustical Institute AN SSSR)

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DATE ACQ: 10Apr64

ENCL: 00

SUB CODE: GP

NO REF SOV: 006

OTHER: 001

Card 3/3